UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Offic
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Washington, D.C. 20231

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/332,415	06/14/99	LESIEUR R	C-2354

IM22/1227

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EXAMINER	
RIDLEY, B	
ART UNIT	**PAPER NUMBER**
1764	6

DATE MAILED: 12/27/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)	
	09/332,415	LESIEUR, ROGER R.	
	Examiner	Art Unit	
	Basia Ridley	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 October 2000* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,7,9,12-20,22 and 23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,7,9,12-20,22 and 23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☒ The proposed drawing correction filed on *13 October 2000* is: a)☒ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim(s) 1 recite(s) the limitation(s) "the processed gas stream" (line(s) 15). There is insufficient antecedent basis for said limitation(s) in the claim(s).

Claim(s) 9 recite(s) the limitation(s) "said noble metal catalyst" (line(s) 1-2). There is insufficient antecedent basis for this limitation in the claim.

Claim 9 states the limitation "selected from the group consisting of platinum, palladium **and** rhodium, **and** mixtures thereof". This claim is indefinite, as the alternative expressions are in a form of improper Markush group. Suggested correction: --selected from the group consisting of platinum, palladium, rhodium, and mixtures thereof--. See MPEP 2173.05(h).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 23, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Clawson (WO 98/08771), in view of Narumiya et al. (USP 4,308,233) and further in view of Setzer et al. (USP 4,415,484).

Regarding claim(s) 23 Clawson discloses a similar autothermal reformer assembly (Fig. 3), the assembly comprising:

a) a catalyst bed (200), said catalyst bed including an inlet end (210) and an outlet end (270), an inlet portion of said catalyst bed being operable to combust a portion of the methanol fuel gas (P20/L23-24) thereby enabling start up of the reformer assembly while inhibiting carbon deposition in catalyzed cells of said foam catalyst bed (P24/L1-7 & P5/L12-19).

While Clawson does disclose using a supported catalyst in the catalyst bed, the reference does not explicitly disclose said catalyst being supported on a monolithic open cell foam.

Narumiya et al. teaches a catalyst bed comprising:

- a monolithic open cell foam core (Fig. 1, C4/L30-32).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a monolithic open cell foam core structure, as taught by Narumiya et al., as s support for the catalyst in the assembly of Clawson, for the purpose of providing structure which allows the fuel gas to always be in contact with the surface of the catalyst to accelerate gas diffusion and to prevent the direct passage of unreacted gas.

While Clawson does disclose combusting portion of the fuel gas in the inlet region of the reactor for the purpose of rising the temperature of the of the fuel gas stream and enabling start up of the reformer assembly (P24/L1-7), the reference does not explicitly disclose said inlet region

being provided with a noble catalyst which is operable to combust a portion of the fuel gas stream at a temperature of about 200°F.

Setzer et al. teaches an inlet portion of a catalyst bed being provided with:

- a catalyst which is operable to combust a portion of the fuel gas stream at a temperature of about 200°F (C4/L29-66).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a noble catalyst which is operable to combust a portion of the fuel gas stream at a temperature of about 200°F, as taught by Setzer et al., in the inlet portion of the catalyst bed of Clawson, for the purpose of allowing greater flexibility in the maximum allowable reactor temperature and the method of introducing the air into the reactor.

5. Claims 1-2, 7, 9, 12-20 and 22, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Clawson (WO 98/08771), in view of Narumiya et al. (USP 4,308,233), further in view of Setzer et al. (USP 4,415,484) and further in view of Dicks (USP 3,904,554).

Regarding claim(s) 1 Clawson discloses a similar autothermal reformer assembly (Fig. 3), the assembly comprising:

a) a catalyst bed (200), said catalyst bed including an inlet end (210) and an outlet end (270), a first inlet region of said catalyst bed being operable to combust a portion of the fuel gas stream so as to raise the temperature of said fuel gas stream in said first region to a temperature in the range of about 300° to about 500°F while inhibiting carbon deposition in catalyzed cells of said foam catalyst bed (P24/L1-7 & P5/L12-19), and said catalyst bed further including a subsequent region which contains a catalyst (225);

b) a fuel gas stream inlet passage (208), said fuel gas stream inlet passage (208) being disposed in heat exchange relationship with a process gas stream outlet passage from said catalyst bed whereby heat is transferred to said fuel gas stream inlet passage from the processed gas stream (P20/L7-11 & P21/L7-10);

c) an air inlet passage (232), said air inlet passage being disposed in heat exchange relationship with the process gas stream whereby heat from the process gas stream is transferred to said air inlet passage (P22/13-15); and

d) a fuel gas stream reforming catalyst (225) deposited in said catalyst bed (200).

While Clawson does disclose using a supported catalyst in the catalyst bed, the reference does not explicitly disclose said catalyst being supported on a monolithic open cell foam.

Narumiya et al. teaches a catalyst bed comprising:

- a monolithic open cell foam core (Fig. 1, C4/L30-32).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a monolithic open cell foam core structure, as taught by Narumiya et al., as s support for the catalyst in the assembly of Clawson, for the purpose of providing structure which allows the fuel gas to always be in contact with the surface of the catalyst to accelerate gas diffusion and to prevent the direct passage of unreacted gas.

While Clawson does disclose combusting portion of the fuel gas in the inlet region of the reactor for the purpose of rising the temperature of the of the fuel gas stream (P24/L1-7), the reference does not explicitly disclose said inlet region being provided with a catalyst which is operable to combust a portion of the fuel gas.

Setzer et al. teaches an inlet portion of a catalyst bed being provided with:

- a catalyst which is operable to combust a portion of the fuel gas (C4/L29-66).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a catalyst which is operable to combust a portion of the fuel gas, as taught by Setzer et al., in the inlet portion of the catalyst bed of Clawson, for the purpose of allowing greater flexibility in the maximum allowable reactor temperature and the method of introducing the air into the reactor.

While Clawson does disclose and said catalyst bed further including a subsequent region which contains a catalyst (225), the reference does not explicitly disclose said subsequent region which contains a copper and/or zinc catalyst.

Dicks teaches a steam reforming process wherein reforming region contains a copper and/or zinc catalyst (Abstract & C5/L7-10).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a copper and/or zinc catalyst, as taught by Dicks, in the reforming region of the reformer of Clawson, for the purpose of providing a catalyst which is more resistant to poisoning by sulfur than other catalysts, usually containing nickel, which are generally used in steam reforming process.

Regarding claims 2, 7 and 9, Clawson, in view of Narumiya et al., further in view of Setzer et al. and further in view of Dicks disclose all the claim limitations as set forth above. Additionally Setzer et al. teaches an autothermal reformer assembly, wherein:

- said catalyst in said first region of said catalyst bed includes a noble metal and calcium oxide (C2/L5-6 & C4/L29-66);

- said first region of said catalyst bed contains an iron oxide catalyst in combination with calcium oxide (C4/L29-66);
- said noble metal catalyst is a catalyst selected from the group consisting of platinum, palladium, rhodium and mixtures thereof.

Regarding claim 12, Clawson, in view of Narumiya et al., further in view of Setzer et al. and further in view of Dicks disclose all the claim limitations as set forth above. Additionally Narumiya et al. teaches an assembly, wherein:

- said foam core catalyst bed includes at least one ceramic foam support body (C2/L45-49).

Regarding claims 16-17 and 19, Clawson, in view of Narumiya et al., further in view of Setzer et al. and further in view of Dicks disclose all the claim limitations as set forth above. Additionally Clawson discloses an autothermal reformer assembly, wherein:

- said catalyst bed is cylindrical in shape (Fig. 3);
- said fuel gas stream inlet passage (208) contains a fuel gas/steam mixture (P20/L7-9);
- said fuel gas is methanol (P20/L23-24).

Regarding claim(s) 20 Clawson discloses a similar autothermal reformer assembly (Fig. 3), the assembly comprising:

a) a cylindrical catalyst bed (200), said catalyst bed including an inlet end (210) and an outlet end (270);

b) a fuel gas/steam mixture inlet passage (208, P20/L7-9);

c) a fuel gas reforming catalyst (225) deposited in said catalyst bed (200).

While Clawson does disclose using a supported catalyst in the catalyst bed, the reference does not explicitly disclose said catalyst being supported on a monolithic open cell foam.

Narumiya et al. teaches a catalyst bed comprising:

- a monolithic open cell foam core (Fig. 1, C4/L30-32).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a monolithic open cell foam core structure, as taught by Narumiya et al., as s support for the catalyst in the assembly of Clawson, for the purpose of providing structure which allows the fuel gas to always be in contact with the surface of the catalyst to accelerate gas diffusion and to prevent the direct passage of unreacted gas.

While Clawson does disclose combusting portion of the fuel gas in the inlet region of the reactor for the purpose of rising the temperature of the of the fuel gas stream (P24/L1-7), the reference does not explicitly disclose said inlet region being provided with a noble metal catalyst which is operable to combust a portion of the fuel gas.

Setzer et al. teaches an inlet portion of a catalyst bed being provided with:

- a noble metal catalyst which is operable to combust a portion of the fuel gas (C4/L29-66).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a catalyst which is operable to combust a portion of the fuel gas, as taught by Setzer et al., in the inlet portion of the catalyst bed of Clawson, for the purpose of allowing greater flexibility in the maximum allowable reactor temperature and the method of introducing the air into the reactor.

While Clawson does disclose and said catalyst bed further including a subsequent region which contains a catalyst (225), the reference does not explicitly disclose said subsequent region which contains a copper and/or zinc catalyst.

Dicks teaches a steam reforming process wherein reforming region contains a copper and/or zinc catalyst (Abstract & C5/L7-10).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a copper and/or zinc catalyst, as taught by Dicks, in the reforming region of the reformer of Clawson, for the purpose of providing a catalyst which is more resistant to poisoning by sulfur than other catalysts, usually containing nickel, which are generally used in steam reforming process.

Regarding claim(s) 22 Clawson discloses a similar autothermal reformer assembly (Fig. 3), the assembly comprising:

a) a catalyst bed (200), said catalyst bed including an inlet end (210) and an outlet end (270), an inlet portion of said catalyst bed being operable to combust a portion of the fuel gas thereby enabling start up of the reformer assembly while inhibiting carbon deposition in catalyzed cells of said foam catalyst bed (P24/L1-7 & P5/L12-19);

b) a fuel gas stream inlet passage (208), said fuel gas stream inlet passage (208) being disposed in heat exchange relationship with a process gas stream outlet passage from said catalyst bed whereby heat is transferred to said fuel gas stream inlet passage from the processed gas stream (P20/L7-11 & P21/L7-10);

c) an air inlet passage (232), said air inlet passage being disposed in heat exchange relationship with the process gas stream whereby heat from the process gas stream is transferred to said air inlet passage (P22/13-15); and

d) a fuel gas stream reforming catalyst (225) deposited in said catalyst bed (200).

While Clawson does disclose using a supported catalyst in the catalyst bed, the reference does not explicitly disclose said catalyst being supported on a monolithic open cell foam.

Narumiya et al. teaches a catalyst bed comprising:

- a monolithic open cell foam core (Fig. 1, C4/L30-32).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a monolithic open cell foam core structure, as taught by Narumiya et al., as s support for the catalyst in the assembly of Clawson, for the purpose of providing structure which allows the fuel gas to always be in contact with the surface of the catalyst to accelerate gas diffusion and to prevent the direct passage of unreacted gas.

While Clawson does disclose combusting portion of the fuel gas in the inlet region of the reactor for the purpose of rising the temperature of the of the fuel gas stream and enabling start up of the reformer assembly (P24/L1-7), the reference does not explicitly disclose said inlet region being provided with a noble catalyst which is operable to combust a portion of the fuel gas stream at a temperature of about 200°F.

Setzer et al. teaches an inlet portion of a catalyst bed being provided with:

- a catalyst which is operable to combust a portion of the fuel gas stream at a temperature of about 200°F (C4/L29-66).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a noble catalyst which is operable to combust a portion of the fuel gas stream at a temperature of about 200°F, as taught by Setzer et al., in the inlet portion of the catalyst bed of Clawson, for the purpose of allowing greater flexibility in the maximum allowable reactor temperature and the method of introducing the air into the reactor.

While Clawson does disclose and said catalyst bed further including a subsequent region which contains a catalyst (225), the reference does not explicitly disclose said subsequent region which contains a copper and/or zinc catalyst.

Dicks teaches a steam reforming process wherein reforming region contains a copper and/or zinc catalyst (Abstract & C5/L7-10).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a copper and/or zinc catalyst, as taught by Dicks, in the reforming region of the reformer of Clawson, for the purpose of providing a catalyst which is more resistant to poisoning by sulfur than other catalysts, usually containing nickel, which are generally used in steam reforming process.

6. Claims 13-15, as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Clawson (WO 98/08771), in view of Narumiya et al. (USP 4,308,233), further in view of Setzer et al. (USP 4,415,484) and further in view of Dicks (USP 3,904,554), as applied to claims 1-2, 7, 9 and 12-19 above, and further in view of Sheller (USP 5,384,099).

Clawson, in view of Narumiya et al., further in view of Setzer et al. and further in view of Dicks disclose all the claim limitations as set forth above, but the references not disclose the catalyst bed comprising a high temperature-compatible metal support connected to a source of electrical current so as to serve as a resistance heating element by being heated to operating temperature within about twenty seconds of applying electrical current thereto.

Sheller teaches a monolithic catalyst bed, wherein:

- said catalyst bed includes an autothermal reformer-operating temperature-compatible metal support selected from the group consisting of stainless steel, nickel alloys and iron-aluminum alloys (C1/L26-29);
- said metal support is connected to a source of electrical current, so as to serve as a resistance heating element (C1/L52-63);
- said metal support is electrically heated to operating temperature within about twenty seconds of applying electrical current thereto (C1/L65-66).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a high temperature-compatible metal support connected to a source of electrical current, as taught by Sheller, in the catalyst bed of Clawson, in view of Narumiya et al., further in view of Setzer et al. and further in view of Dicks, for the purpose of activating the catalyst during the start up of the reformer.

7. Claims 18, as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Clawson (WO 98/08771), in view of Narumiya et al. (USP 4,308,233), further in view of Setzer et al. (USP 4,415,484) and further in view of Dicks (USP 3,904,554), as applied to claims 1-2, 7, 9 and 12-19 above, and further in view of Bhattacharyya et al. (USP 5,498,370).

Regarding claims 18, Clawson, in view of Narumiya et al., further in view of Setzer et al. and further in view of Dicks disclose all the claim limitations as set forth above. Additionally Clawson discloses an autothermal reformer assembly, wherein:

- said air inlet passage contains air (P23/L19-22).

Clawson does not explicitly disclose said air inlet passage containing an air/steam mixture.

Bhattacharyya et al. a process using steam as a temperature modifier and to avoid soot formation in partial oxidation of hydrocarbons (C2/L53-55).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to add steam, as taught by Bhattacharyya et al. to said air inlet passage of Clawson, for the purpose of using the steam as a temperature modifier and to avoid soot formation.

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 1-2, 7, 9, 12-18, 20 and 22 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-22 of copending Application No. 09/321,390 in view of Dicks (USP 3,904,554).

The copending application claims does not explicitly claim said subsequent region which contains a copper and/or zinc catalyst.

Dicks teaches a steam reforming process wherein reforming region contains a copper and/or zinc catalyst (Abstract & C5/L7-10).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a copper and/or zinc catalyst, as taught by Dicks, in the reforming region of

the reformer claimed by 09/321,390, for the purpose of providing a catalyst which is more resistant to poisoning by sulfur than other catalysts, usually containing nickel, which are generally used in steam reforming process.

This is a provisional obviousness-type double patenting rejection.

10. Claim 19 and 23 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-22 of copending Application No. 09/321,390 in view of in view of Dicks (USP 3,904,554) as applied to claims 1-2, 7, 9, 12-18 above, and further in view of Clawson (WO 98/08771).

While the copending application do not explicitly claim said fuel gas being methanol, using methanol as a fuel was well known in the art at the time the invention was made (as evidenced by Clawson (P20/L23-24), the fuel selection being driven by system requirements, such desired finished product composition and by fuel availability and cost.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use methanol as fuel gas, as taught by Clawson, in a process claimed by 09/321,390, for the purpose of obtaining desired product at optimal process cost.

This is a provisional obviousness-type double patenting rejection.

Response to Arguments

11. Applicant's arguments filed on 13 October 2000 have been fully considered but they are not persuasive.

12. The applicant argues that many of examiners rejections under 35 U.S.C 112(2) are not proper because said statute is directed to those skilled in the art in question and not to examiners in the USPTO.

In response the examiner notes that she can be considered one of ordinary skill in the art, as the art area applicable in the instant invention is that of hydrocarbon reforming, and one of ordinary skill in this art is considered to have at least a BS degree, with additional education in the field and at least 3 years practical experience working in the art; is aware of the state of the art as shown by the references of record, to include those cited by applicants and the examiner (*ESSO Research & Engineering V Kahn & Co.*, 183 USPQ 582 1974) and who is presumed to know something about the art apart from what references alone teach (*In re Bode*, 193 USPQ 12, (16) CCPA 1977); and who is motivated by economics to depart from the prior art to reduce costs consistent with the desired product characteristics. *In re Clinton* 188 USPQ 365, 367 (CCPA 1976) and *In re Thompson* 192 USPQ 275, 277 (CCPA 1976).

13. The applicant argues that rejection of claims 1-23 as being incomplete is not proper because section of MPEP cited be examiner, specifically MPEP § 2172.01, provides guidance for 35 U.S.C 112(1) rejections and not for 35 U.S.C 112(2) rejections.

While said rejection of claims 1-23 has been withdrawn, the examiner would like to point out that MPEP § 2172.01 states that:

> "(...) a claim which fails to interrelate essential elements of the invention as defined by applicant(s) in the specification may be rejected under **35 U.S.C. 112, second paragraph**, for failure to point out and distinctly claim the invention. See *In re Venezia*, 530 F.2d 956, 189 USPQ 149 (CCPA 1976); *In re Collier*, 397 F.2d 1003, 158 USPQ 266 (CCPA 1968)." Emphasis added.

14. The applicant argues that there is not motivation to substitute the Narumiya et al. catalyst bed for the Clawson catalyst bed because it appears that reformer of Clawson does not have problems which would be solved by catalyst bed which allows the fuel gas to always be in contact with the surface of the catalyst to accelerate gas diffusion and to prevent the direct passage of

unreacted gas. Further the applicant argues that one would not be likely to use an oxidizing catalyst bed in a steam reformer, because if one did make such substitution the result would be to oxidize or burn all of the hydrocarbons in the fuel gas, which would be an undesirable result in steam reformer.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Narumiya et al., in C2/L24-31, states that disclosed catalyst structure allows the fuel gas to always be in contact with the surface of the catalyst to accelerate gas diffusion and to prevent the direct passage of unreacted gas. Since this structure improves conversion, it will enhance performance of any catalytic device.

Further the examiner notes that Narumiya et al. was not relied upon to teach using an oxidizing catalyst in a steam reformer.

The examiner has however relied on the disclosure of Narumiya et al. to teach a cylindrical monolithic open cell foam structure (Fig. 1, C4/L30-32).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a monolithic open cell foam structure, as taught by Narumiya et al., as support for the catalyst in the assembly of Clawson, for the purpose of providing structure which allows the

fuel gas to always be in contact with the surface of the catalyst to accelerate gas diffusion and to prevent the direct passage of unreacted gas.

15. Applicant's arguments that inlet section containing noble metal catalyst and a subsequent section containing copper and/or zinc catalyst, as recited in claim 20 are not found in the either Clawson or Narumiya et al. have been considered but are moot in view of the new ground(s) of rejection.

16. The applicant argues that the examiner's analysis of Clawson is incorrect, because numeral 208 in Clawson denotes initial portion of catalyst bed filled with catalyst 214 and not the fuel gas inlet, said fuel gas inlet being denoted by numeral 219. Therefore, as the fuel gas inlet passage 219 is not disposed in heat exchange relationship with processed gas passage, the pre-heating of the fuel gas stream as claimed in instant application does not occur.

In response the examiner notes that Fig. 3 of Clawson shows a passage 208 in heat exchange relationship with passage 224. A gas stream to be reformed by catalyst 225 contained in said passage 224 to form processed gas enters through said passage 208, therefore said passage 208 is a fuel gas inlet passage.

Further the examiner notes that the instant claim language: "a hydrocarbon fuel gas autothermal reformer assembly comprising (...)" does not distinguish between the instant invention and the reformer assembly disclosed by Clawson, as said language does not exclude reformer assemblies wherein a fuel gas inlet passage further comprises a catalyst.

Additionally, the examiner would like to point out that passage 219 is also in heat exchange relationship with processed fuel gas stream outlet passage 224, as passage 219 comes in

contact with reformer 200 and reformer 200 comprises passage 224. Therefore there is a heat exchange between said passages 219 and 224.

In response to applicant's argument that the references fail to show certain features of applicant's invention, the examiner notes that the features upon which applicant relies (i.e., pre-heating of the fuel gas) are not recited in the rejected claim(s), as said claims merely recite heat exchange relationship, "whereby heat will be transferred to said fuel gas inlet passage from the processed gas stream". Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

17. The applicant argues that Setzer et al. '484 does not teach a foam core catalyst.

In response the examiner notes that Setzer et al. '484 was not relied upon to teach foam catalyst regardless typographical error which included phrase "foam core" in rejection on page 11 of previous Office action.

The examiner has however relied on the disclosure of Narumiya et al. to teach a monolithic open cell foam structure (Fig. 1, C4/L30-32).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a monolithic open cell foam structure, as taught by Narumiya et al., as support for the catalyst in the assembly of Clawson, for the purpose of providing structure which allows the fuel gas to always be in contact with the surface of the catalyst to accelerate gas diffusion and to prevent the direct passage of unreacted gas.

18. Applicant's arguments with respect to claims 1-4, 7-9 and 22 have been considered but are moot in view of the new ground(s) of rejection.

19. The applicant argues that combination of references used to reject claims 22 and 23 does not disclose a reformer assembly which combusts a portion of the fuel gas at a temperature of about 200°F to enable start-up of the reformer assembly.

In response the examiner notes that combination of references used to reject claims 22 and 23 was not relied upon to disclose a reformer assembly which combusts a portion of the fuel gas at a temperature of about 200°F.

The examiner has however relied on said reference combination to disclose reformer assembly which is operable to combusts a portion of the fuel gas at a temperature of about 200°F, as the term operable means "being such that use or operation is possible" (The American Heritage® Dictionary of the English Language, Third Edition copyright © 1992 by Houghton Mifflin Company; Electronic version licensed from INSO Corporation). As combustion of a portion of the fuel gas stream at a temperature of about 200°F does not impart any further structural limitations on the reformer assemblage as disclosed by said combination of references, it is examiner's position that said reformer assemblage is operable to combusts a portion of the fuel gas at a temperature of about 200°F.

20. In response to applicants comments regarding rejection of claims under judicially created doctrine of obviousness-type double patenting the examiner would like to point out that claims can not be allowed if they are rejected.

Conclusion

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Basia Ridley, whose telephone number is (703) 305-5418. The examiner can normally be reached on Monday through Thursday, from 6:45 AM to 5:15 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marian Knode, can be reached on (703) 308-4311.

The fax phone number for Group 1700 is (703) 305-3599 (for Official papers after Final), (703) 305-5408 (for other Official papers) and (703) 305-6078 (for Unofficial papers). When filing a fax in Group 1700, please indicate in the Header (upper right) "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communication with the PTO that are not for entry into the file of the application. This will expedite processing of your papers.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Basia Ridley
Examiner
Art Unit 1764

BR
December 20, 2000

Hien Tran

HIEN TRAN
PRIMARY EXAMINER